

PRODUCTIVE USE OF THE TREE ROW UNDERSTOREY

Opportunities for crop diversification



THE WHAT AND WHY

The tree understorey – a waste of space?

Planting trees into arable or vegetable fields means that land is taken out of annual production; depending on the design of the system, this could be up to 25% of the cropping area. There may be no return from the trees for many years after planting; this varies from approximately five years for fruiting species or short rotation coppice systems, to several decades for timber species. In many agroforestry systems, the area in the tree rows between the trees trunks and under the tree canopy



watch video



Wakelyns Agroforestry, Suffolk UK; an aerial view shows how 25% of the land area is occupied by the tree rows. Permaculture Association, UK

is an overlooked and underutilised space and, unmanaged, this can create problems with weed control. Rather than being viewed as a wasted space, this tree row area could provide new opportunities for introducing new crops, therefore increasing production and diversifying the range of marketable products from the farm.

Rhubarb as an understorey crop at Tolhurst Organics, UK. Organic Research Centre



watch video



HOW IS THE CHALLENGE ADDRESSED

Herbs, flowers, fruit, vegetables..... take your pick!

One option to use the understorey of the tree row is to plant new crops to provide an income in the years following tree establishment, or longer term if shade tolerant species are used. Ideally, the new crop will complement what is already produced (e.g. new lines of fruit or vegetables in a horticultural enterprise) but new markets may need to be sought or interest generated for the new crop within existing markets; some creativity may be needed (e.g. direct selling or adding value to produce by making jam). New

crops that could be established underneath the trees include herbs, flowering bulbs or cut flowers, perennial fruit and vegetables such as globe artichokes or rhubarb, mushrooms and berry bushes. Within the different crop types, some species and varieties will be better suited to the conditions found in tree rows (particularly levels of tolerance to shade) and it may be worth trialling varieties or species on a small scale first to identify those best suited, before scaling up.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727872.

Keywords: Diversification; silvoarable; tree row; crops; understorey

eurafagroforestry.eu/afinet



HIGHLIGHTS

- Establishing understorey crops can provide income in the short term before the trees reach a productive stage.
- Understorey crops can help repay tree planting costs within two to three years, if a market can be found for the new crops.
- Introducing new crops to the system diversifies the range of marketable products as well as increases overall productivity.



watch video

Spring bulbs for bunches of cut flowers.
Silvoarable system in Nottinghamshire,
UK. Ref : Organic Research Centre

ADVANTAGES AND DISADVANTAGES

Increasing complexity; the pros and cons.....

As well as increasing overall productivity, integrating new understorey crops can diversify the range of marketable products from the farm. The new crops may also benefit biodiversity such as bees and butterflies by providing new habitats and resources. However, this increase in complexity can also present challenges, and the following points need consideration:

Be realistic about the extra resources needed.....

The initial establishment costs need to be considered, as well as the extra labour requirements for planting new crops. Looking forward, what extra infrastructure is needed for the new crop product? For example, extra storage space, or processing equipment. What are the labour requirements for on-going maintenance and harvesting? Ideally, choose crops that can be harvested and managed during quieter periods of the year.

Is there enough space under the trees for new crops to succeed?

In some tree systems, such as short rotation coppice, or high density fruit trees, the competition for resources such as sunlight, water and nutrients from the trees may be too strong to allow any understorey crops. Bear in mind that as the trees grow, the microclimate conditions will change, with shade and belowground competition increasing. This may mean that the understorey crops will need to change over time also, or eventually be out-competed.

FURTHER INFORMATION

The Agroforestry Research Trust (www.agroforestry.co.uk) has produced some beautiful and useful publications that cover a range of potential understorey crops.

Crawford, M. (2010) *Creating a Forest Garden* describes the design process and suggests a number of temperate species that could be considered for the tree understorey, as well as on-going maintenance requirements. Green Books ISBN 978-1-900322-62-1.

Plants for a Future (www.pfaf.org) is an on-line database of over 7000 edible and medicinal plants which allows you to search using a number of criteria e.g. a plant for sandy soils, between 1 and 5m tall, that likes shade.

Smith et al (2017) *Lessons learnt: Silvoarable agroforestry in the UK*. Report on new silvoarable system including opportunities for including understorey crops.

http://www.agforward.eu/index.php/en/silvoarable-agroforestry-in-the-uk.html?file=files/agforward/documents/LessonsLearnt/WP4_UK_Silvoarable_2_lessons_learnt.pdf

